Domain Switching in Lead Titanate

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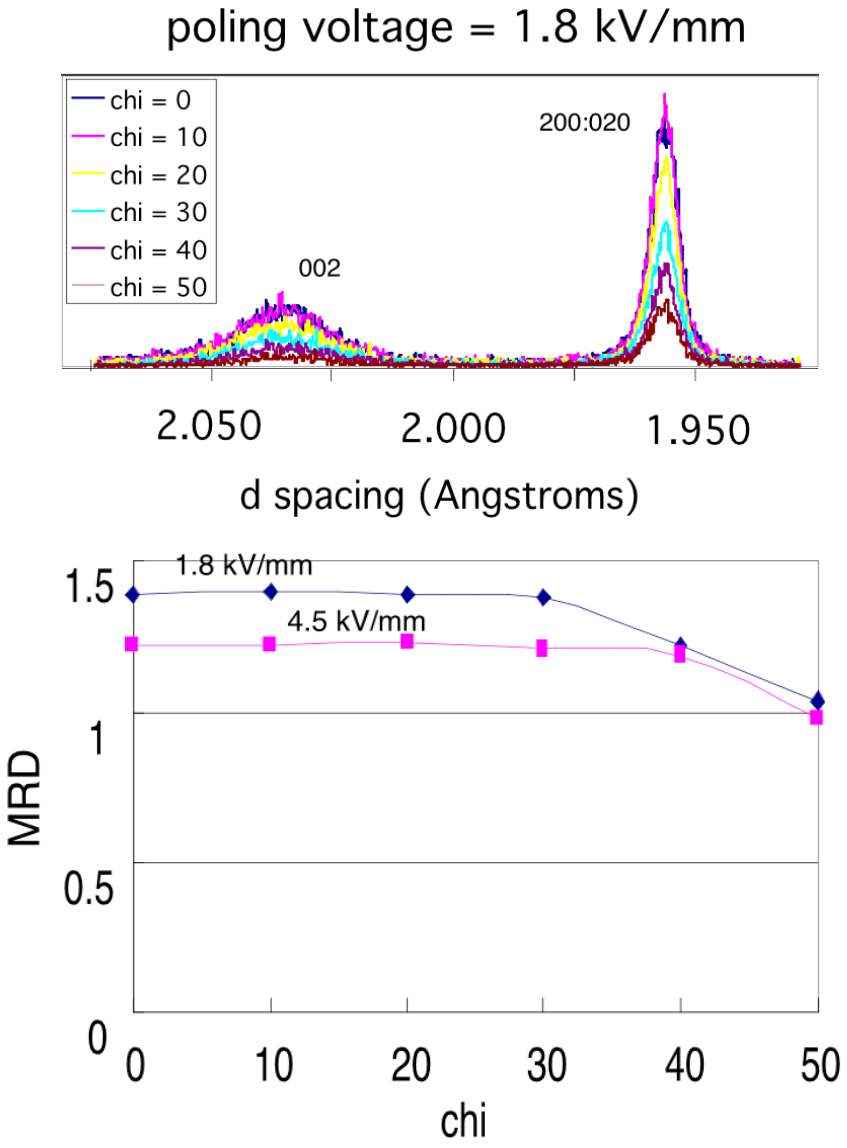
The nature of domain switching in piezoelectric ceramics has included suggestions that 180 degree switching is accomplished by first passing through 90 degree switches in most lead zirconate titanate materials. Recent results by Waser and coworkers have shown that in unconstrained thin films of high tetragonality lead titanates the switching proceeds directly without 90 degree switching. In a fully constrained ceramic lead titanate it might be anticipated that the high stresses associated with 90 degree switching would also be suppressed. The results on the left show that 90 degree domain switching does occur in a ceramic even with a tetragonality of c/a=1.04 and that it is possible to plot a pole figure representing the degree of 90 degree domain switching from synchrotron x-ray data obtained at various tilt angles (chi).



Research into the Classroom

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- The intro course MSE 190 teaches first year engineering students about materials in an applications context and therefore offers the opportunity to discuss the applications of our research.

https://engineering.purdue.edu/MSE/Resources/MSE190/stuff

- A Tutorial Background and Research Poster from Tiffany Finch, MS student on this research program, was presented at the 30th National Society of Black Engineers Conference. One of the figures from this poster is shown.